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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/593,332	09/19/2006	Farouk Tedjar	129497	9903
27049	7590	02/17/2010		
OLIFF & BERRIDGE, PLC				
P.O. BOX 320850				
ALEXANDRIA, VA 22320-4850				
EXAMINER				
RUMP, RICHARD M				
ART UNIT		PAPER NUMBER		
1793				
NOTIFICATION DATE		DELIVERY MODE		
02/17/2010		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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### Office Action Summary

**Application No.**

10/593,332

**Applicant(s)**

TEDJAR ET AL.

**Examiner**

Richard M. Rump

**Art Unit**

1793

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 November 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 15-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15-25 and 28 is/are rejected.
- 7) ☒ Claim(s) 26 and 27 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Status of Application***

Claims 15-28 are pending and presented for examination.

### ***Priority***

Acknowledgement is made of applicant's request for foreign priority under 35 U.S.C. §119(a)-(d). Certified copies of the priority documents have been **received**.

### ***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on 16 October 2006 is acknowledged and the references listed thereon have been considered by the examiner on the attached copy of the PTO-1449 form.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 15-21 are rejected under 35 U.S.C. 103(a) as being unpatentable US PG Pub No. 20030180604 to Zenger in view of US Patent No. 6447669 to Lain and US Patent No. 6524737 to Tanii with US PG Pub No. 20040013732 to Farber as an evidentiary reference to common cathodes.**

Regarding claims 15-17 & 19, Zenger discloses the shredding (crushing) of a lithium ion battery ([0020], [0022]-[0023], [0070] (lithium ion batteries have a nickel or cobalt cathode as evidenced by [0017] of Farber) at 293 K (Room temperature) under a protective gas (CO<sub>2</sub>, Ar; [0045], [0009], [0023] (Any concentration of inert gas would be an obvious expedient as long as the entire atmosphere is inert, which is disclosed by Zenger). Zenger does not expressly state the usage of magnetic separation and sieve followed by aqueous hydrolysis. However, in a process for recycling a lithium ion battery (column 7, line 50), Tanii discloses the usage of a rotary and hammer mill (figure 10 & column 17, lines 14-22) magnetic separation and sieving (figure 1) followed by hydrolysis (to result in a lithium hexafluorophosphate: column 11, line 8). A skilled artisan would find the usage of magnetic separation and sieving obvious to perform in the process of Zenger to only let the metal components pass (for material separation) and due to the fact the lithium cobalt molecules are so small (column 9, lines 35-38 & column 31, lines 14-20) that they need to be separated out.

Also, neither reference states usage of a densification table. This is cured by Lain who discloses separation by density (which would qualify as usage of a densification table *per se*; column 3, lines 36-42).

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to separate by densities using a densification table as outlined in Lain as used in Zenger. The teaching or suggested motivation in doing so is that it enables one to more easily store the materials (*Id.*).

Regarding claim 18, it would be obvious to a skilled artisan to operate the mill in order to safely comminute the battery but not too fast to cause any chance at explosion.

Regarding claim 20, Zenger does not expressly state sieving the sizes from 3mm to 500 microns. However, Tanii discloses sieving to 300 microns (column 19, lines 7-8) along with the above magnetic separation. A skilled artisan would be motivated to do sieving for classification of particle sizes for further treatment as mentioned above, as such in event of *arguendo*, it would have been obvious to a skilled artisan to perform sieving at any mesh size in order to enable classification and further treatment based on distinct particle sizes.

Regarding claim 21, water dispersal can take place (Tanii: column 17, line 58) to recover the lithiophosphate (column 17, lines 51-52).

**Claims 15 & 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zenger and Lain (as applied above) in view of JP 10-046266 (Provided by applicant).**

Regarding claim 15, Zenger discloses the above mentioned limitations and does not expressly state those also stated. In a process for lithium recovery, '266 discloses communuting a lithium cell ([0005]) followed by magnetic separation, sieving and application of HCl (aqueous hydrolysis) ([0010]-[0020]). Therefore it would have been obvious to one having an ordinary level of skill in the art at the time of invention to perform the process of Zenger in view of the magnetic separation of '266. The teaching or suggested motivation in doing so is to easily extract different metal values ([0006]).

Regarding claim 20, separation into magnetic and non-magnetic sections would meet the limitations of the claim along with usage of sieving as sieving at the instantly claimed conditions as a skilled artisan would have found it obvious to perform sieving at any mesh size in order to enable classification and further treatment based on distinct particle sizes ([0030]-[0033]).

**Claims 15 & 18-21, 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zenger Lain (as applied above) in view of FR 2827710 to Tedjar (Translation provided).**

Regarding claims 15, 18-21, Zenger discloses the same as above. However, in a process for recovering metal values from a used battery, Tedjar discloses the usage of crushing in an inert atmosphere (between cold gears; meeting rotary mill (With the rpms being an obvious expedient (See MPEP *Id.*)), magnetic separation from 3 mesh to 500 microns and then subjects it to a sulfuric acid treatment and water ((aqueous hydrolysis) Pages 1-3). Therefore it would have been obvious to one having an ordinary level of skill in the art at the time of invention to perform the recovery method of Zenger in view of the hydrolysis and magnetic separation of Tedjar. The teaching or suggested motivation in doing so is that Tedjar's process enables dissolution of soluble salts (Page 3). The cathode materials are considered functional equivalents as evidenced by the prior stated evidentiary reference. Furthermore water is a commonly added substance for solvency.

Regarding claim 23, Tedjar discloses that the acid application is done in the milling process with the usage of steel shots (Page 4). While 2N sulfuric acid, the 80 C

temperature and the steel shot ratio is not expressly stated, both of these would be variables a skilled artisan would wish to control and arrive at their value through routine experimentation.

Regarding claim 24, Tedjar discloses the usage of electrolysis between 400 and 600 A/m<sup>2</sup> (As the incorporated reference, EP0620607 mentions 4 to 6 A/dm<sup>2</sup>) with a pH between 2.8 and 4 (page 1) in order to achieve a trivalent manganese oxide, though this and the instantly claimed trivalent cobalt oxide appear to be the same in the battery arts (Page 2). It is not seen what patentable difference the material of the electrodes have, and since just steel electrodes are disclosed, these are considered to overlap stainless steel electrodes.

**Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zenger in view of Tanii or Tedjar as applied to claim 21 above, and further in view of US Patent No. 2548037 to Leonard.**

Regarding claim 22, Zenger in view of Tanii or Tedjar does not expressly state the usage of soda and phosphoric acid as double pH modifiers for the purposes of precipitating out lithium from the lithiophosphate. However, in a method to recover lithium values from lithium samples both Leonard and . Leonard discloses that one would wish to add soda to the lithium containing phosphate (lithiophosphate) recovery (Leonard: Column 3, lines 1-15). One having an ordinary level of skill in the art at the time of invention would be motivated to perform the recovery process of Zenger and Tanii or Tedjar in view of the ash addition of Leonard as adding ash will increase the solubility of the ash (Leonard: *Id.*).

Leonard also states the usage of a generic acid (column 4, lines 56-75), the Examiner asserts that one would add an acid to increase solubility, and since phosphoric acid is one from a definite number of possible choices, it would be obvious to perform the usage of phosphoric acid (KSR Int'l Co. v. Teleflex, Inc., 550 U.S. 398 (2007)).

**Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zenger in view of Tedjar as applied to claim 23 above, and further in view of US Patent No. 20030134199 to Christian.**

Regarding claim 25, Zenger in view of Tedjar does not expressly state the usage of hypochlorite. However in a process for lithium battery construction, Christian discloses the usage of sodium hypochlorite to recover cobalt values ([0020]). Therefore it would have been obvious to one having an ordinary level of skill in the art at the time of invention to perform the recovery method of Zenger and Tedjar in view of the hypochlorite addition of Christian. The teaching or suggested motivation in doing so is to create a cathodic material ([0013]). The pH would be an obvious expedient a skilled artisan would be motivated to control in order to not damage the obtained hydroxide.

**Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zenger in view of either Tanii or '266 as applied to claim 15 above, and further in view of JP 10-287864 (Provided by applicant).**

Regarding claim 28, Zenger in view of Tanii or '266 do not expressly state the usage of sulfuric acid at 80 C to recover lithium and phosphate. However, in a process for the recovery of values from a lithium cell, '864 discloses the usage of a mineral acid



(sulfuric acid is one) between 0 and 100 C with hydrogen peroxide ('864: [0019]-[0021]). Since this encompasses the instantly claimed range, a *prima facie* case of obviousness exists (See MPEP 2144.05). Therefore it would have been obvious to one having an ordinary level of skill in the art to perform the recycling method of Zenger in view of Tanii or '266 in view of the usage of sulfuric acid of '864. The teaching or suggested motivation in doing so is that return the oxidation of the metal values for further extraction ([0019]) as the cited species  $\text{LiMn}_2\text{PO}_4$  appears to be similar in scope to  $\text{LiFePO}_4$  (See KSR, *Id.*). Note that the molarity of the sulfuric acid is an obvious expedient which a skilled artisan would be motivated to control.

#### ***Allowable Subject Matter***

Claims 26-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an Examiner's reasons for allowance:

Regarding claims 26-27, none of the cited prior art, which is deemed to be the closest prior art reasonably suggests or teaches the claimed usage of lithium chloride (as  $\text{LiCl}$ ) as an aqueous stabilization aid for hexafluorophosphate  $\text{PF}_6$  anion.

#### ***Response to Arguments***

Applicant's arguments, see remarks, filed 30 November 2009, with respect to the rejection(s) of claim 15 under 103 have been fully considered and are persuasive.

Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Lain.

Applicant's arguments that it would not be obvious to sort by density are no longer persuasive as Lain teaches that one would wish to sort the pieces by density. As this is applicants only real argument, it is now considered moot.

### ***Conclusion***

Claims 15-25 and 28 have been rejected. Claims 26-27 appear to be allowable, but since they are dependant upon rejected claim 15, they are objected to.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard M. Rump whose telephone number is (571)270-5848. The examiner can normally be reached Monday through Friday 7:00 AM-4:30 PM EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached at (571)272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/R. M. R./  
Examiner, Art Unit 1793

/Stuart Hendrickson/  
Primary Examiner, Art Unit 1793